

[54] **NOISE PRODUCING DEVICE**

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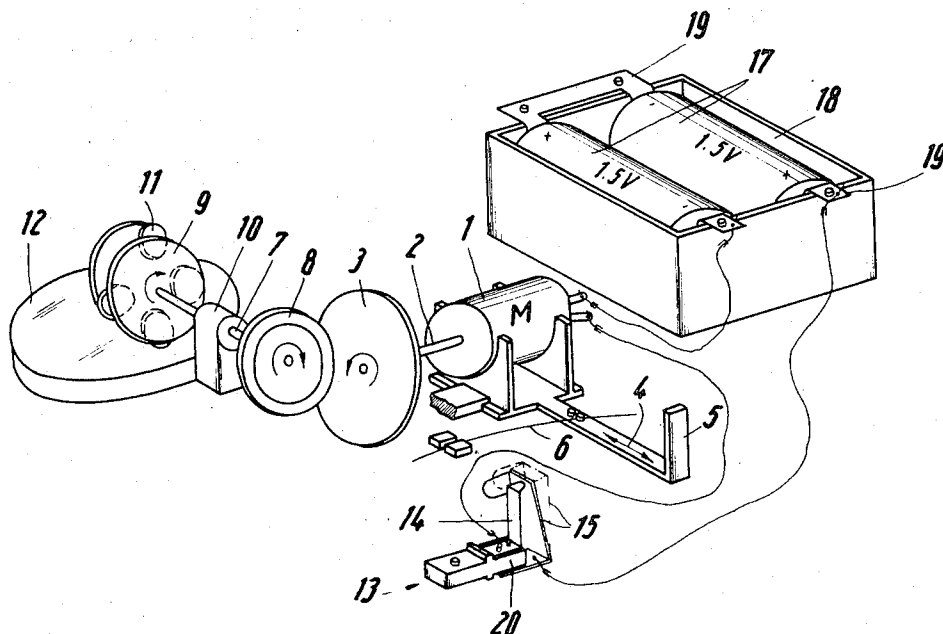
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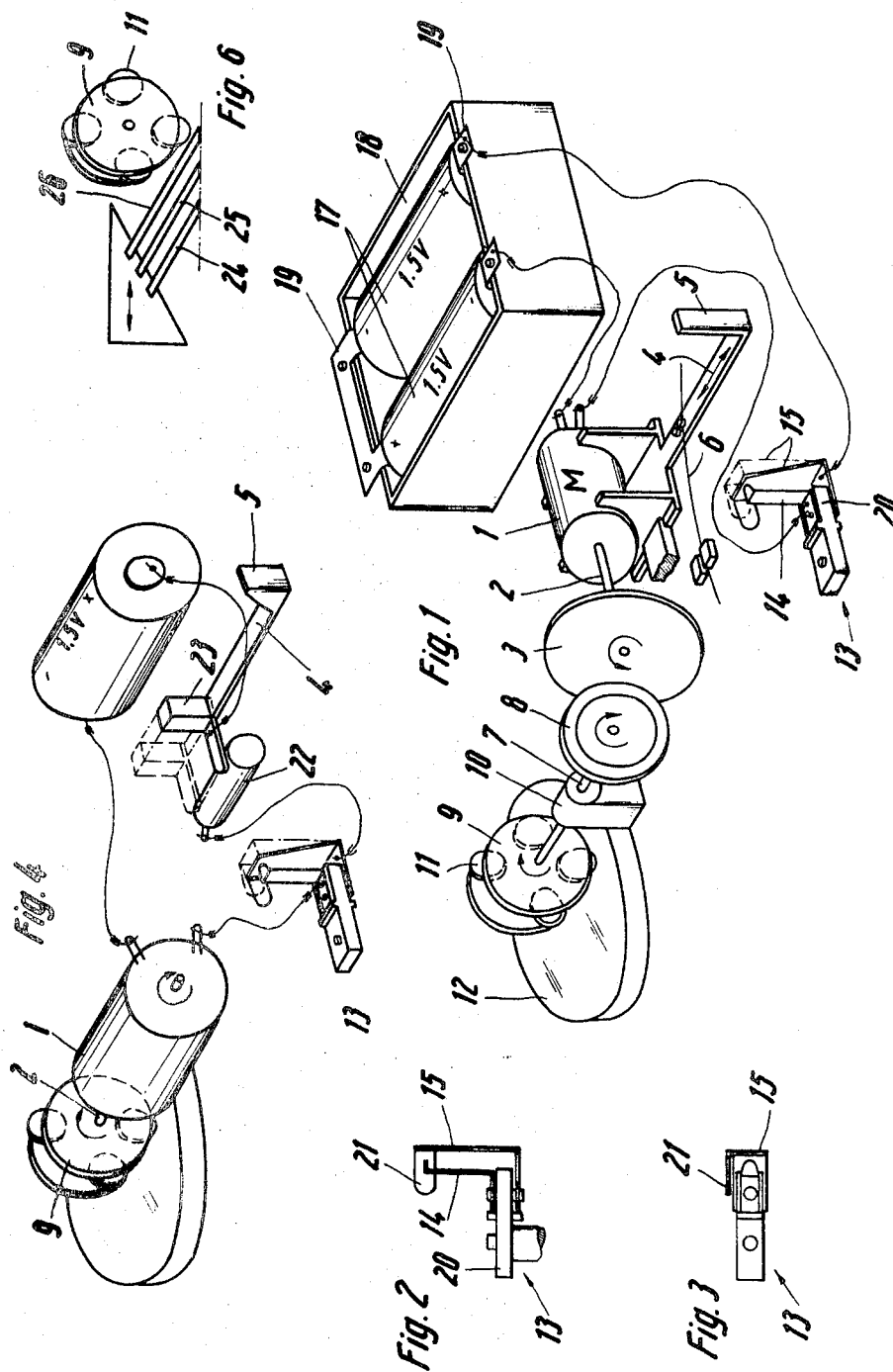
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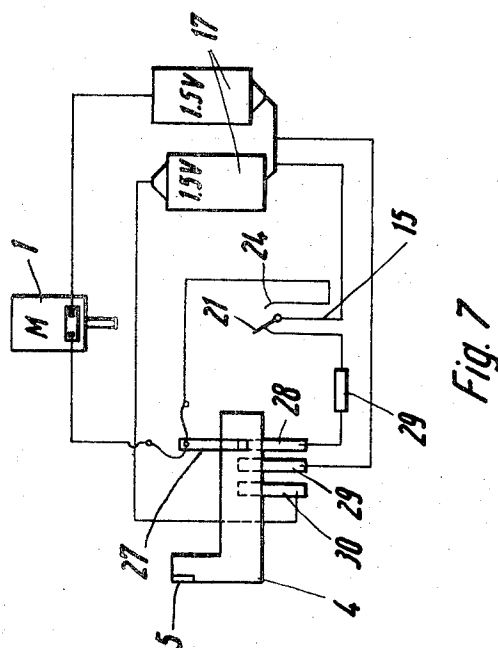
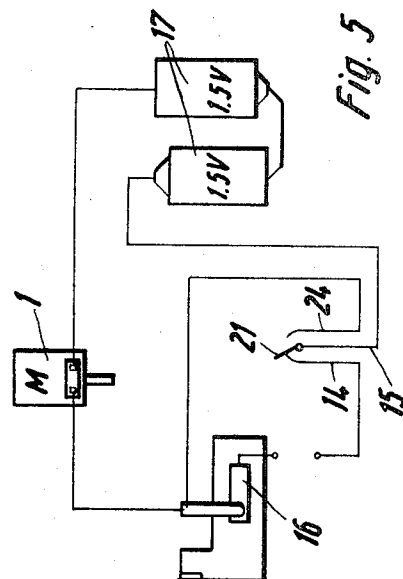
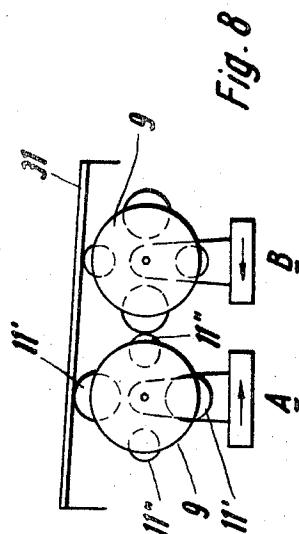
[57] **ABSTRACT**

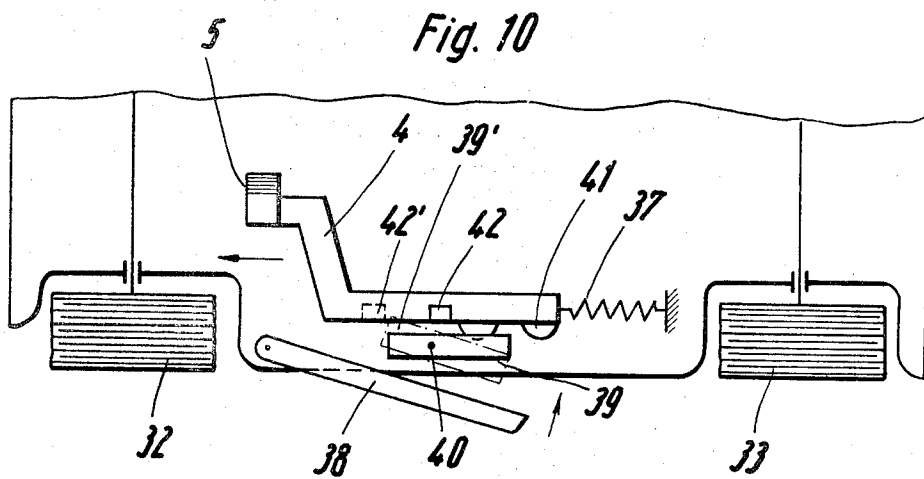
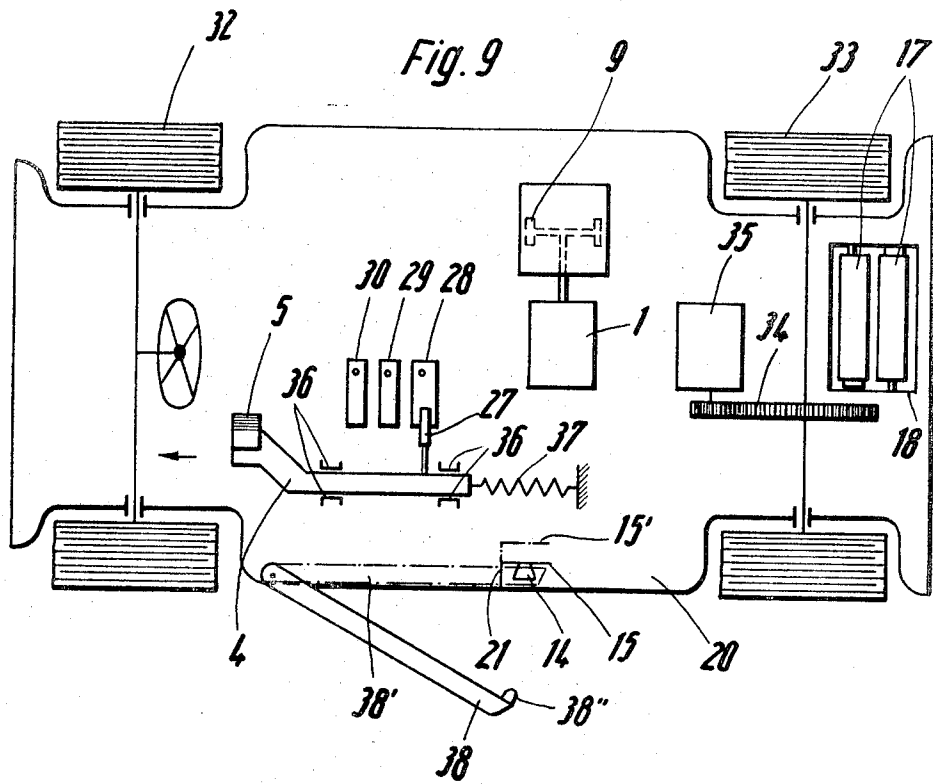
Means for imitating the noises of an automobile engine for use in toy vehicles which include a simulated accelerator pedal as an adjusting means, an electric motor, a noise producing device driven by the motor under control of the pedal which is adjustable to change the frequency and the sound volume of the noise produced by the device.

11 Claims, 10 Drawing Figures









NOISE PRODUCING DEVICE

BACKGROUND OF THE INVENTION

The invention relates to noise producing devices for the toy industry. More in particular the invention concerns a device driven by an electric motor for producing motor or engine noises on toy vehicles. It is known to provide an electrically operated resistance control for the electro-motor drive of the noise producing device which is actuated by a separate manual operating means on a toy vehicle. This provides for the playing child only an incomplete reproduction of the actual occurrences that take place in the real life art. The operating member provided on the known device, which is a rotatable knob is unrealistic. In addition to that this device is very complicated and therefore expensive, as well as subject to failure or break down.

SUMMARY OF THE INVENTION

Accordingly the invention is concerned with the problem to provide for the playing child with simple means an arrangement for imitating the noises that develop when the engine is started and when the vehicle is actually set in motion.

In order to solve this problem the invention provides a control device that imitates a gas operating pedal or lever which is in the form of a slide, in order to change the frequency of the noise producing device.

The device for changing the frequency of the noise affords the possibility for the playing child to make the "engine" of his vehicle roar such as is the case in actual life as the vehicle starts out. The illusion is complete because the device is a copy of an actual accelerator pedal or lever.

In accordance with a preferred embodiment of the invention an interrupter contact arrangement or other stopping device may be provided, which as the door is opened switches on the noise producing device, or makes possible the operating thereof, and turns off or stops the noise producing device as the door is closed. This provides different possibilities of play for the child. As in real life he must first open his car door in order to be able to produce an engine noise. In accordance with another embodiment of the invention it is possible that, as the door is opened the engine for producing the noise is connected to the battery by way of a resistor that reduces its potential so that the engine and the noise producing device which it drives rotate only at a low speed.

BRIEF DESCRIPTION OF THE DRAWINGS

Further features and advantages of the invention will become apparent from the following description of embodiments illustrated in the drawings, in which

FIG. 1 shows a perspective view of a first embodiment of the invention,

FIG. 2 is a longitudinal section of the interrupter contact device,

FIG. 3 is a top view of FIG. 1,

FIG. 4 is a perspective view of a further embodiment,

FIG. 5 shows a modification of the interrupter circuit,

FIGS. 6-8 are further variations of the invention,

FIG. 9 is a schematic illustration showing the principle of installing a device in accordance with the invention in the chassis of a toy vehicle, and

FIG. 10 is an illustration similar to FIG. 9, but with

a different mechanically acting stopping arrangement.

DESCRIPTION OF THE INVENTION

The engine or motor 1 of the noise producing device is shown in FIG. 1, on the running shaft 2 of which a friction disc 3 is firmly mounted. The engine 1 is slidable transversely to its longitudinal direction by means of slide 4, 5, component 5 of which is a copy of a gas operating lever. It is mounted in a suitable manner in the passenger space of the vehicle (see also FIGS. 9 and 10) and it can be actuated by the playing child. The resetting of the engine to its starting position is effected with a spring 6.

The friction wheel 8 and a beating member support 9 of the noise producing device are mounted on an axle or shaft 7, which is rotatably mounted in bearing 10. When the axle is rotated, the movable beater members or clappers 11 of the support 9 beat against the sound member 12. Depending on the speed of the axle 7 they produce in this manner a low or a high sound. The speed of the axle can be varied by moving the motor 1 back and forth by means of the slide 4, 5. Although the engine runs at constant speed, the speed of the wheel 8 changes in accordance with its distance from the center point of the friction disc 3 and therefore the resulting circumferential speeds. A friction coupling of this type is very robust and simple.

In this embodiment the shaft 7 is journaled non-slidably in the bearing 10. It would, of course, also be possible to make the arrangement in the opposite sense, by mounting the engine 1 in a fixed, non-slidable position and by means of a slide make the shaft 7 slidable together with the friction wheel 8 and the noise producing device 9, 11, 12.

The engine 1 can be connected to the battery 17 and thus started to run by opening the door of the vehicle which is not shown here, but in FIG. 9. For this purpose a contact means 13 is provided, having a contact tongue 14 firmly mounted on the base plate 20 and conductively connected with a contact clamp. The other clamp of the contact means 13 leads to a resilient contact tongue 15 which, when the door is open engages contact 14, and thus places a potential on the engine, while with the door closed it is raised by its pressure lug 21 from the contact 14 as shown in dashed lines in FIG. 1. Thus, with the door open the engine first runs at constant speed, preferably at low speed by connecting a resistor 16 in the line as shown in FIG. 5. Inasmuch as the slide 4, 5 is not yet operated during this starting operation, the distance from the center of the disc 3 is relatively small and thus the noise produced is relatively low and of slow frequency. If the door is closed, contacts 14, 15 are separated from one another, the engine stands still and the noise stops. Reference numerals 18 and 19 identify the housing for the battery and its contact springs, respectively.

Besides the interrupter contacts 14, 15 a starting contact 24 may also be provided, which in accordance with FIG. 5 is directly connected to the terminal clamp of the engine 1, and not by way of a resistor 16 as is the contact 14. Contact 24 is preferably located proximate to the interrupter contacts 14, 15 and is briefly closed as the door is opened. For this purpose a cam 38' or the like on the door can effect during a short phase of the opening movement pressing of the contact tongue 15 against the contact 24. By means of this brief application of full potential to the engine 1 its starting is

greatly facilitated. If at standstill it were connected to the battery by way of the resistor 16, i.e. it would only receive a partial potential, that could result in starting difficulties.

In accordance with the embodiment of FIG. 4 the slide 4, 5 can also cooperate with a sliding spring 23, or it can form a unitary component therewith. The spring 23 slides over a variable resistor 22. Depending on the position of the spring relative to the resistor 22 a different potential and therefore a different speed is imparted to the engine 1, as a result of which the speed of the beating member support is changed and high or low sounds are produced. Also in this embodiment the interrupter contact arrangement 13, 14, 15 in accordance with FIGS. 1-3 can be provided.

The concept of the invention to change the frequency of the sound of the engine of a power driven vehicle by displacing the gas operating lever may also be realized in accordance with the example of FIG. 6 as follows:

The beating member support 9 is driven by the engine at a constant speed. The clappers are identified at 11. A membrane having three members 24 - 26 is moved to the right or to the left as indicated by the arrows by means of a slide which is not indicated here, but which is analogous to the slide 4, 5 in the previous embodiments. The membrane parts 24, 25, 26 are constituted in such a manner that as the clappers 11 beat against them sounds of different frequencies are produced. Depending on which membrane part is beaten against by the clappers, a corresponding sound is produced. It is, of course, also possible to provide more than three membranes.

The frequency of the engine noise produced, in this embodiment the speed of rotation of the beating clappers, can be furthermore changed in that different potentials are supplied to the drive motor for the noise producing means. This can be done in a manner that two batteries of different potential, for example 1.5 Volts and 3 Volts are connected to the motor one after the other. In this connection the potential of the first battery can again be subdivided by means of a resistor. For this purpose an arrangement in accordance with the embodiment in accordance with FIG. 7 is possible. In the circuit setting shown in the drawing a switch tongue 27, which is moved by the slide 4, 5 is located on the contact tongue 28 and connects the engine 1 to 1.5 Volts by way of resistor 29. Engine 1 rotates slowly and the noise producing means produces a correspondingly slow and soft idling noise. Also in this case the start up circuitry described with reference to FIG. 5 in relation to components 21, 24 may be provided.

If the switch tongue 27 is on contact tongue 29, the engine is connected to the total 1.5 volt potential of the batteries 17. The noise produced is higher in frequency and louder in sound strength. The "combustion engine runs at normal speed." In the change-over of the terminal tongue 27 to the contact tongue 30, the engine is in series with the two batteries 17 and thus is supplied with a potential of 3 Volts. The playing child is given the impression that his "motor vehicle is running at maximum speed."

The illusion of the roaring of an internal combustion engine can also be improved in that the clapper components are so constituted or are so arranged in the clapper support, that with slow speeds only a part of the beaters is operative and only with higher speeds all of

them are operative. The possibility of an embodiment of such a concept is illustrated in FIG. 8. The beater support 9 is provided with two each clapper elements 11' and 11'' of such different size that the elements 11' project further outwardly than the elements 11''. Furthermore the membrane 31 is in an inclined position relative to the direction of the slide which is not illustrated in this figure. In the position A of the slide (slow speed) the beater support has imparted to it a slower speed and only the two larger clappers 11' beat against the membrane. In the slide position B however (rapid speed) the speed of the support 9 is correspondingly greater and all four clappers 11' and 11'' beat against the membrane. Therefore, the frequency and the strength of the sound are correspondingly higher.

FIG. 9 illustrates schematically in a top view the chassis of a toy vehicle forming the base plate 20 with front wheels 32 and rear wheels 33, which are driven by way of a gear 34. The slide member 4 carrying the imitation of an accelerator pedal 5 is displaceably carried in the guide members 36 of the base plate against the effect of a spring 37. In this example the arrangement for changing the speed of the noise producing motor 1 in accordance with the example of FIG. 7 is schematically illustrated while the electric leads are omitted. It would also be possible, however, to effect in the same manner by means of a slide 4, 5 mounted on the base plate of the chassis, the change of the frequency and the volume of the sound in accordance with the other embodiments described.

Furthermore FIG. 9 illustrates the electrical contact interrupter arrangement 14, 15. With the door 38 open the contact between members 14, 15 is established. However, if the door is closed as indicated at 38' the tongue 15' is raised up from tongue 14 and the contact is broken so that the engine 1 cannot start as indicated by the dot and dash lines.

FIG. 10 shows also in a schematic fragmentary plan view a further modification of the invention. Proximate the slide portion 4 a latch lever 39 is disposed for rotation about the pin 40 so that it can swing over the element. This takes place as the slide element is moved forward in the direction of the arrow, in that cam 41 rocks lever 39 out of the position drawn in solid lines into the position illustrated in the interrupted lines. In this position the edge 39' of lever 39 is behind the protrusion 42 of the slide 4 which in this position is identified as 42'. In this manner the slide 4 is held in position against being pulled back by the spring 27. This is preferably that position in which a soft low frequency noise is produced, i.e. "the vehicle engine is idling." By pressing the slide 4, 5 further forward, noises of higher frequency and strength can be produced. If the door is closed, it swings the lever 39 back into the position shown in solid lines and the spring 37 pulls the slide 4, 5 into its initial position in which the engine stands still.

Having now described my invention with reference to the embodiments illustrated in the drawings, what I desire to protect by letters patent is set forth in the appended claims.

1. A toy vehicle equipped with a device operated with an electric motor drive for producing engine noises, said device comprising an adjusting means in the form of a slide simulating a gas accelerator pedal mounted in said toy vehicle, an electric motor, and a noise producing device actuated by said motor under control of said pedal, said pedal being operative to

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change the frequency and the sound volume of the noise produced by said noise producing device, said toy vehicle including a door and means for actuating and stopping said motor operative in response to the closed position of said door to stop said motor.

2. Device in accordance with claim 1, including a contact breaking device associated with said motor and said door that is closed in response to the opening of said door.

3. Device in accordance with claim 2, including a battery connected to said contact breaking device and a potential reducing resistor in circuit with said motor, whereby said motor is connected to said battery in response to closing said contact breaking device.

4. Device in accordance with claim 3, including a starting contact preferably disposed proximate said contact breaking device, operative to be closed briefly in response to closing said door and supply the full potential to said motor.

5. Device in accordance with claim 1, including a latching device proximate said door operative in response to the closed position of said door to assume its initial position in which said slide is free.

6. Device in accordance with claim 5, including a friction disc driven by said motor, a friction wheel in engagement with said friction disc and driven thereby,

a noise producing means driven by said friction wheel, and adjusting means operative to set the spacing between said friction wheel and the center of said friction disc.

7. Device in accordance with claim 5, including a resistor disposed in the circuit of said electro-motor and movable for adjustment by said slide.

8. Device in accordance with claim 5, including a membrane having components adapted to produce various sounds, clappers operative to actuate membranes, said membranes being adjustable relative to said clappers and means operative to place different membrane parts in actuating relation to said clappers.

9. Device in accordance with claim 8, including a biasing spring associated with said slide.

10. Device in accordance with claim 5 where said slide is operative to connect said motor to different potentials.

11. Device in accordance with claim 8, including a clapper support operatively connected to said friction wheel and supporting clappers and means responsive to low speed of said friction wheel to actuate only a part of said clappers and in response to higher speed to actuate all clappers.

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